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ABSTRACT

A study to determine the effects of higher level interactive questioning procedures on the cognitive abilities of gifted students was conducted with 14 gifted sixth grade students. The students were selected from a public school enrichment program and randomly assigned to one of two groups that met for five weekly sessions. The control group was given traditional tasks (observe a picture, hear a passage read, or read a passage, then answer primarily recall-type questions), with the additional task of recording their number of correct answers. The experimental group experienced a combination teaching strategy that included: (1) a personal graph on which students recorded the types of questions they asked or answered; (2) explanations of four question categories--recall, think critically, think creatively, and evaluate; (3) focused teacher preparation of questions; (4) student initiated questions; (5) plateaus strategy (based on R. T. Hyman's strategic questioning concept); and (6) emphasis on process rather than on number of correct answers. Pretest and posttest scores on the Ross Test of Higher Cognitive Processes demonstrated that the higher cognitive processes used by the experimental students improved in the areas of sequencing and questioning strategies. (AEA)

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Questioning: A Reading/Thinking Foundation for the Gifted

Report of a Research Project

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Questioning: A Reading/Thinking Foundation

for the Gifted

Most gifted students can read. Many can read quite well. However, this does not mean that creative/productive students do not have reading needs. A review of the literature reveals that gifted students are often more advanced, more quickly than other students (Bronson, 1979). Their reading needs include critical, creative, evaluative reading as well as inferential, abstract thinking tasks supported by a fundamental base of knowledge. The preferred learning styles of the gifted and the most effective learning settings for these students are unique and different from traditional methods (Dunn & Price, 1980; Griggs & Price, 1980; Martinson, 1976). Questioning strategies can provide meaningful opportunities for the gifted to learn, strengthen, and enhance their reading/thinking skills.

To determine if inclusion of higher level interactive questioning procedures affects the cognitive processes of gifted students, a study was conducted in the fall of 1980. With the cooperation of the Las Cruces, New Mexico, Public Schools, under the approval of Ms. Mary Jane Wood, Director of Elementary Curriculum, and with the agreement of Ms. Susan Dyche, Director-Teacher of the Enrichment Resource Center (ERC) of the Las Cruces Public Schools, fourteen gifted students participated in the questioning project. These students were sixth graders participating in the ERC. Each student attended the center on Wednesdays and attended his or her regular school the remainder of the week. Criteria for selection to the ERC program included scores on several assessment instruments (California Test of

Basic Skills, Rating Scale for Identifying Creative Potential, Structure of the Intellect Learning Abilities Test) as well as teacher recommendation (Dyche).

For the purposes of the questioning project, the fourteen participating students were randomly assigned to either the control or experimental group. Seven students comprised each group. To determine the effectiveness of the treatments given to the sample students during the project, the Ross Test of Higher Cognitive Processes (Ross & Ross, 1976) was administered as a pretest and as a posttest. All students in both groups took the pretest and posttest except for two students in the experimental group who were absent on the day of the posttest administration.

Following the pretest, the researcher met for approximately 35 minutes with each group on five Wednesdays. The tasks of the control group were traditional in nature: observe a picture, hear a passage read, or read a passage then answer questions posed by the researcher. The questions were mainly of the recall type. The emphasis was for students to get as many correct answers as possible. Based on the concept of immediate student feedback (Lamberg, 1977), students in the control group kept a record of the number of correct responses he or she made (see Appendix A).

In meeting with the experimental group, the researcher employed the following strategies:

1. Personal achievement graphs--again considering immediate student feedback, charts (Lamberg, 1977) were kept as they were in the control group. However, these graphs related to types of questions asked by the students and

to types of questions answered (see Appendix B).

2. Explanations of question categories--The researcher taught the students four types of questions. These types included recall, think critically, think creatively, evaluate. These categories are based on those previously defined by various authorities in the discipline (see Figure 1). Interpretations of the categories and examples for each kind were presented.
3. Focused preparations--In both the experimental and control groups, basically the same content (pictures or passages) was employed. Preparations for the groups were different. For the various experimental sessions, the researcher formulated specified types of questions about the picture or reading passage under consideration.
4. Student initiated questions (Hunkins, 1976)--On one occasion, students were directed to ask as many questions as possible about a picture and passage presented. These student questions were then labeled as to type (recall, think critically, think creatively, evaluate). Students with assistance from the researcher provided the labels.
5. Plateaus strategy--Based on Hyman's (1979) concept, the investigator asked the categorized questions after the students had read a designated passage or heard a

Bloom et al. (1956)	Guilford (1956, 1967)	Sanders (1966)	Guszak (1972)	Hyman (1979)	
Knowledge	Cognitive	Memory	Locating Information	Definitional	RECALL
Comprehension	Memory	Translation	Remembering		
		Interpretation		Empirical	THINK CRITICALLY
Application	Convergent	Application	Organizing		
Analysis		Analysis	Predicting Outcomes		
	Divergent			Evaluative	THINK CREATIVELY
Synthesis		Synthesis	Extending Ideas		
Evaluation	Evaluative	Evaluation	Evaluating Critically		EVALUATE
				Metaphysical	

Figure 1. A Comparison of Cognitive Categorizations

Analysis Systems (SAS Institute Inc., 1979) computer program.

The t-test procedure was applied to compare the control and experimental groups mean scores on the pretest. The same procedure was applied to compare the performances of the two groups on the posttest.

On the pretest, comparisons of the mean scores did not reveal any statistically significant differences in the thinking processes measured by the Ross instrument. On the posttest, significant differences were revealed on two different variables and a trend toward significance on the composite score mean comparisons. On the section of the posttest which measured sequential synthesis, the difference between the control and experimental groups' mean scores was significant at the 0.03 level (assuming equal variances, $\underline{F} = 10.6$ with 4 and 6 df and observed significance level of 0.01). With such a small chance for error, the treatment given to this experimental group appears to have improved their abilities to sequentially synthesize sentences.

There were statistically significant differences in the mean scores of the two groups on the Questioning Strategies section of the posttest. This part measured the student's ability to evaluate or make a judgment based on information given. Strategies for securing data are judged as to their efficiency in establishing the best information. The differences between the mean scores of the two groups were significant at the 0.05 level (assuming unequal variances, $\underline{F} = 1.21$

passage read about a specified picture. The researcher told the students "these are recall questions." She then moved from student to student asking the designated question type. Then she told the students "these are critical thinking questions" and continued the round of questioning with the new, higher level type of question. When a student responded in an acceptable manner (researcher determined), the young person recorded a correct response in the designated question category on his personal achievement graph.

6. Emphasis on process--As a result of the strategies mentioned above, tape recordings of the treatment sessions and observations by the researcher revealed a greater emphasis on process. When the experimental and control sessions were compared, the disparity between process and product emphasis was apparent.

One week after the last treatment and control sessions, the Ross Test of Higher Cognitive Processes was administered as a posttest. The following section presents the findings and statistical analysis of the data.

Results, Statistical Analysis, and Discussion

Scores in the eight different sections of the Ross test as well as total scores were tabulated and recorded for each student participating in the project. The data were analyzed using a Statistical

and observed significance level--OSL--of 0.89). Again with such a small margin for error, the treatment given the experimental group appears to have improved these students' evaluative skills.

The total score comparison needs to be mentioned although it is not statistically significant at traditional levels. On the pretest, the difference between the mean total scores was negligible (OSL = 0.52). On the posttest, however, the difference between the mean composite scores was significant at the 0.17 level (assuming unequal variances, F = 2.03, 4 and 6 df, OSL = 0.42). With the small sample involved and the reduced amount of difference on the posttest total scores, a trend is indicated regarding the total effects on the experimental group. The treatments given these young people seem to have improved their cognitive processing abilities.

Higher cognitive processes utilized by the experimental students improved in the areas of sequencing and questioning strategies. Limitations of the study will be discussed in the next section.

Limitations of the Study

The students in this project were not randomly selected. They were randomly assigned to either the control or experimental group. Nevertheless, the initial lack of randomization could have contaminated the results.

Another factor which reduces the generalizability of the findings is the small sample size. At the outset, seven students were in each group. One student dropped out of the experimental group halfway

through the project. Another student from the experimental group was absent on the day of the posttest. In all fourteen gifted students participated in the project. Pretest scores are available on all fourteen. Posttest scores are available for twelve students.

Considering these limitations, some positive statements can be made about the results relative to this group of young people. Such statements will be discussed in the project summary and implications for future research.

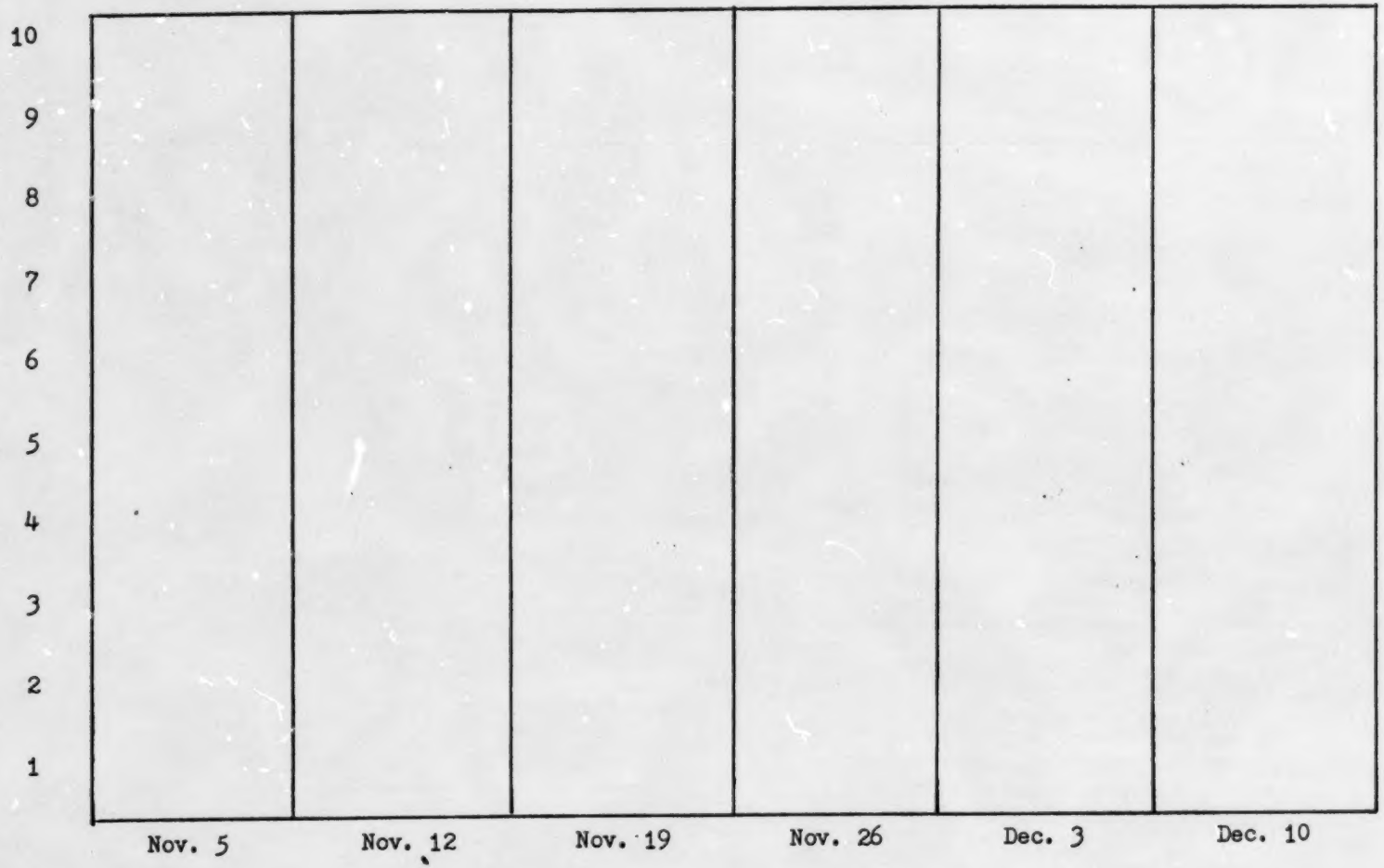
Summary and Implications

After participation in the project (total instruction time $2\frac{1}{2}$ - 3 hours), five students' higher cognitive processes were improved. In the areas of sequential synthesis and questioning strategies, there were overt improvements. On the composite scores of the higher level skills measured, there was a trend toward significant gains.

These findings lead to implications for further research. Investigations in this area, inclusion of higher level interactive questioning, should be conducted involving more students for a longer instructional period. These results could have broader impact on a wider scale.

In the fall of 1980, however, some gifted gifted young people improved their higher level thinking skills. A combination teaching strategy including personal achievement graphs, explanations of question categories, focused preparations, student initiated questions, a plateaus technique, and emphasis on process was employed.

PERSONAL ACHIEVEMENT GRAPH

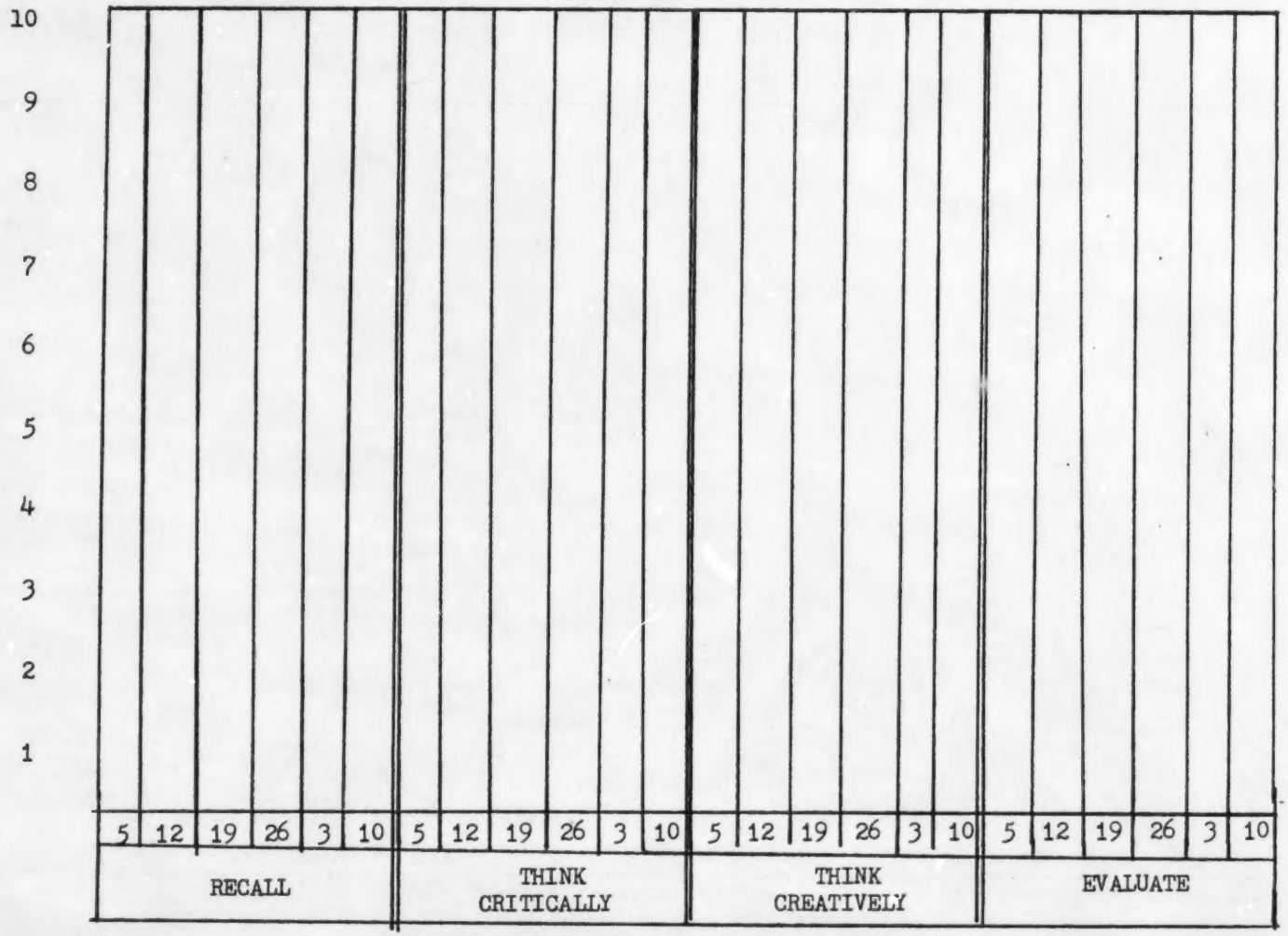


Questions I Have Answered Correctly

Name:_____

Date:_____

PERSONAL ACHIEVEMENT GRAPH I

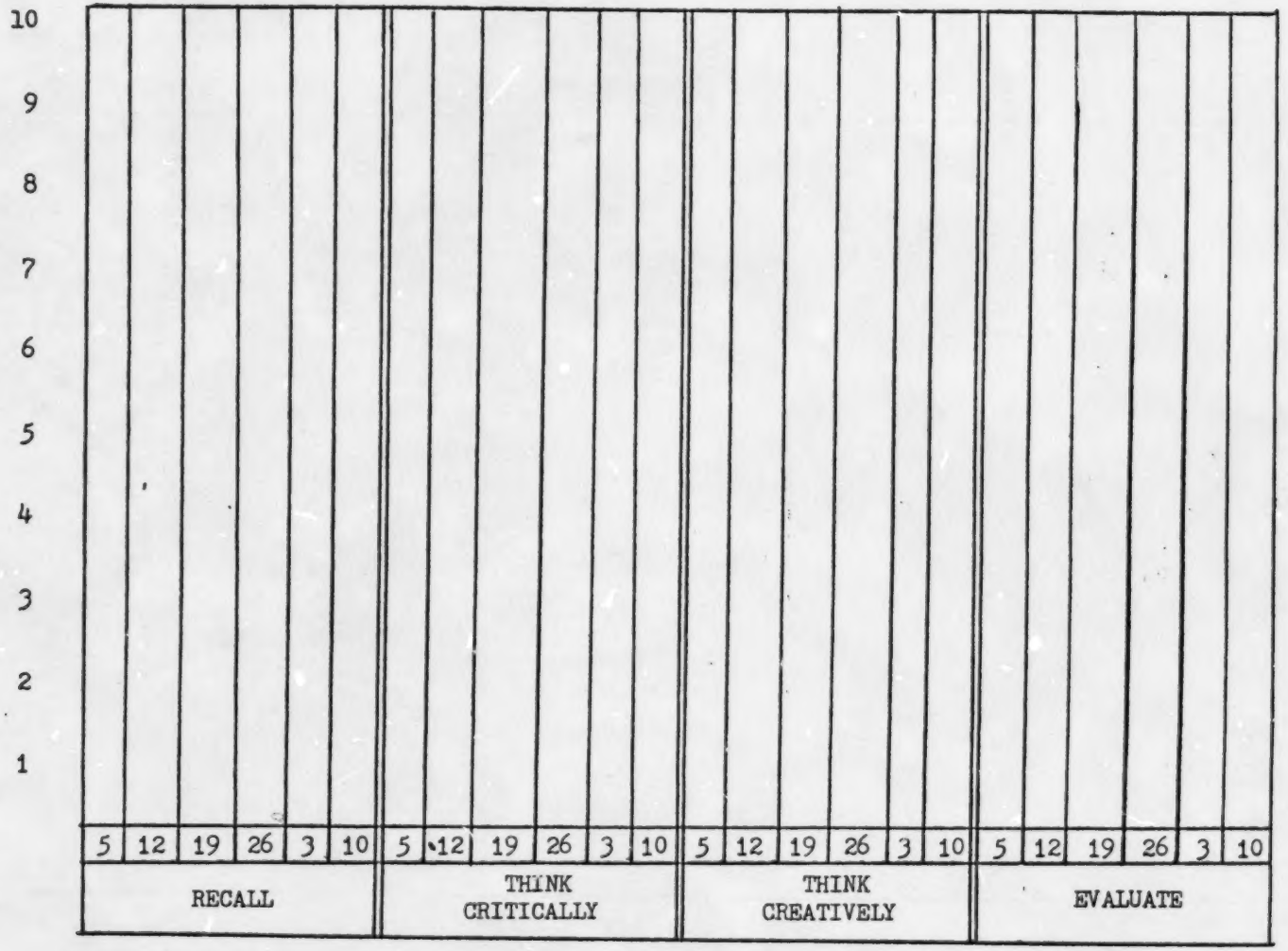


Types and Numbers of Questions I Have Answered

Name:_____

Date:_____

PERSONAL ACHIEVEMENT GRAPH II



Types and Numbers of Questions I Have Asked

Name: _____

Date: _____

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